

What is claimed is:

1. An apparatus for use in the assessment of visual field functions, comprising:
  - a visual display device adapted to display visual stimulus patterns; and
  - a means for generating visual stimulus patterns within a predetermined visual field and for controlling the display of said visual stimulus patterns by said visual display device; wherein:
    - said means for generating visual stimulus patterns is adapted to generate a test stimulus for display in a central region of the visual field and to generate an inducing stimulus for display in a peripheral region of the visual field, and to control the visual display device so as to selectively display the test stimulus alone and in combination with the inducing stimulus in accordance with a predetermined test protocol.
2. An apparatus as in Claim 1 wherein the means for generating visual stimulus patterns is a computer.
3. An apparatus as in Claim 1 wherein the visual display device is a plasma monitor.
4. An apparatus as in Claim 1 further comprising:
  - test electrodes for detecting VEPs in response to visual stimuli displayed by said display device; and
  - a recording device adapted to record VEP signals from said test electrodes and to compare VEP signals generated in response

to the display of the test stimulus alone with VEP signals generated in response to the display of the test stimulus in combination with the inducing stimulus.

5. An apparatus as in Claim 4 wherein there are three test electrodes.
6. An apparatus as in Claim 1 further comprising means to calculate a Laplacian response (second spatial derivative of the potential field distribution) from each set of VEP signals
7. An apparatus as in Claim 6 wherein the means to calculate a Laplacian response is adapted to calculate a ratio of the Laplacian response for the test stimulus alone and the Laplacian response for the combination of the test stimulus and inducing stimulus.
8. An apparatus as in Claim 1 further comprising:  
control means operable by a test subject for increasing and decreasing the contrast of the visual stimulus displayed by the display device and for indicating a threshold contrast value.
9. An apparatus as in Claim 1 adapted to execute a test protocol comprising: generating a first visual stimulus; recording a first threshold contrast value indicated by the test subject using the control means; displaying the stimulus again with a contrast equal to a randomly selected multiple of the first

threshold contrast; recording a second threshold contrast value indicated by the test subject using the control means; repeating this process for a predetermined number of iterations; and calculating a mean threshold contrast value from said first, second and subsequent threshold contrast values.

10. An apparatus as in Claim 1 adapted to calculate a mean threshold value for a stimulus comprising the test stimulus alone and a stimulus comprising the combination of the test stimulus and inducing stimulus, and to calculate the ratio of these two mean threshold values.

11. A method for assessing visual field functions, comprising the steps:

displaying visual stimulus patterns within a predetermined visual field using a visual display device, said visual stimulus patterns comprising a test stimulus displayed in a central region of the visual field and an inducing stimulus displayed in a peripheral region of the visual field; and selectively displaying the test stimulus alone and in combination with the inducing stimulus in accordance with a predetermined test protocol.

12. A method as in Claim 11 wherein the visual display device is a plasma monitor.

13. A method as in Claim 11 further including the steps:

deploying at least three test electrodes for detecting VEPs in response to visual stimuli displayed by said display device; and recording VEP signals from said test electrodes and comparing VEP signals generated in response to the display of the test stimulus alone with VEP signals generated in response to the display of the test stimulus in combination with the inducing stimulus.

14. A method as in Claim 11 further including the step of calculating a Laplacian response (second spatial derivative) from each set of VEP signals and calculating a ratio of the Laplacian response for the test stimulus alone and the Laplacian response for the combination of the test stimulus and the inducing stimulus.

15. A method as in Claim 11 further including the step of; the test subject operating control means to increase and decrease the contrast of the visual stimulus displayed by the display device and to indicate a threshold contrast value.

16. A method as in Claim 11 including a test protocol comprising: generating a first visual stimulus; recording a first threshold contrast value indicated by the test subject using the control means; displaying the stimulus again with a contrast

equal to a randomly selected multiple of the first threshold contrast; recording a second threshold contrast value indicated by the test subject using the control means; repeating this process for a predetermined number of iterations; and calculating a mean threshold contrast value from said first, second and subsequent threshold contrast values.

17. A method as in Claim 11 including the step of; calculating a mean threshold value for a stimulus comprising the test stimulus alone and a stimulus comprising the combination of the test stimulus and inducing stimulus, and calculating the ratio of these two mean threshold values.

18. Apparatus for use in the assessment of visual field functions, comprising:

    a visual display device adapted to display visual stimulus patterns;

    a computer adapted to generate visual stimulus patterns within a predetermined visual field and to control the display of said visual stimulus patterns by said visual display device, said computer being adapted to generate test stimuli for display in a first region of the visual field and to generate visual Gaussian noise patterns of different noise densities for display in at least one other region of the visual field, and to control the value display device so as to selectively display the test stimulus alone and in combination

with the noise pattern in accordance with a predetermined test protocol;  
at least three test electrodes for detecting VEPs in response to visual stimuli displayed by said display device;  
and  
a computer adapted to record VEP signals from said test electrodes, to calculate a Laplacian response (second spatial derivative) from each set of VEP signals, and to derive an internal neural noise value for said first region of the visual field from said Laplacian responses and associated Gaussian noise densities.

19. A method for assessing visual field functions, comprising:

generating visual stimulus patterns within a predetermined visual field using a visual display device, said stimulus patterns comprising test stimuli displayed in a first region of the visual field and visual Gaussian noise patterns of differing noise densities displayed in at least one other region of the visual field; and selectively displaying the test stimulus alone and in combination with the noise pattern in accordance with a predetermined test protocol;  
deploying at least three test electrodes for detecting VEPs in response to visual stimuli displayed by said display device;  
and

recording VEP signals from said test electrodes, calculating a Laplacian response (second spatial derivative) from each set of VEP signals, and deriving an internal neural noise value for said first region of the visual field from said Laplacian responses and associated Gaussian noise densities.